

integrated unit of a lens 28, constructed on the top side 22, and an electro-optical component 3. For the purpose of protection against external influences, the component 3 is embedded in a hermetically tight fashion in a filling compound 30 which also includes a bond wire 32 provided for contacting the component 3 on the top side thereof. As illustrated in FIG. 2A, the bond wire 32 leads to a connecting metallization 34 which extends over a bevel and the base region of a depression 40 holding the component 3. The underside of the component 3 is connected in an electrically conducting fashion to a second metallization 42. When the component unit 20 is mounted on the surface 2, the outer metallization regions 34a, 42a make contact with the corresponding connector pads on the substrate. This type of contacting is known as surface mounting.

Referring again to FIG. 1, the receptacle 12 is arranged so as not to touch with respect to the component unit 20, and makes contact with and is connected to only the surface 2 of the substrate 1. It is possible thereby to achieve a design of the module which is particularly low in strain and is insensitive to temperature changes. Also to be seen is an electrically conducting cap 60 which is attached directly to the surface 2 and by means of which the component unit 20 is electrically screened on the receptacle side.

In the described module, although there may be a need to adjust the receptacle 12 with respect to the component 3 in the X-Y direction—that is to say in the plane perpendicular to the Z-direction—this adjustment is not a problem, because of the smooth surface 2, of planar construction, of the printed circuit board. The module offers the substantial advantage that only comparatively few tolerances influence the accuracy in the Z-direction, with the result that in this regard no adjusting or correcting measures remain necessary after assembly. A further advantage of the module is that the component unit 20 and the receptacle 12 are aligned in the Z-direction with the same reference surface—specifically, the surface 2. The accuracy in the Z-direction is thereby essentially determined only by a single part, i.e., the component unit 20. The substrate thickness, on the other hand, has no bearing. The evaluation or drive electronics for the component 3 can advantageously be arranged on the rear side of the substrate. Favorable radio-frequency properties and a high insensitivity to external disturbances are ensured by short conductor tracks 7 and direct plated-through holes to the component unit 20. The insensitivity is further increased by the cap 60, with which contact is correspondingly made.

With reference to FIG. 3, the perspective view shows a rigid-flexible-rigid circuit carrier 50. The combination comprises a rigid part 1, formed by the substrate, a flexible part 51 with flexible conductors and a further rigid part 52. The circuit carrier 50 can be mounted as a unit during assembly. The result is substantially improved economy with regard to production fastening steps.

We claim:

1. An electro-optical module, comprising:
  - a substrate formed with a mounting surface;
  - a receptacle for an optical fiber plug defining a beam path substantially perpendicular to said mounting surface; and
  - an integrated component unit mounted on said mounting surface, said component unit comprising an electro-optical component and a lens directly aligned with one another in the beam path between said electro-optical component and said receptacle.
2. The electro-optical module according to claim 1, wherein said mounting surface is substantially free from aligning structures.

3. The electro-optical module according to claim 1, wherein the receptacle is disposed so as not to touch said component unit, said receptacle making contact with and being connected substantially only to said mounting surface of said substrate.

4. The electro-optical module according to claim 1, wherein said substrate has a second surface on a side thereof averted from said receptacle, and including an electronic circuit carried on said second surface.

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5. The electro-optical module according to claim 1, which further comprises a cap attached directly to said mounting surface of said substrate for electrically shielding said component unit.

6. The electro-optical module according to claim 1, wherein said substrate forms a part of a rigid-flexible-rigid circuit carrier.

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